6. The method according to claim 5, wherein said polyesterase has at least 50% greater hydrolysis in a UV and/or a MB assay than a similar method without the use of a polyesterase enzyme [the control].

7. The method according to claim 6, wherein said polyesterase has at least 100% greater hydrolysis in a UV and/or a MB assay than than a similar method without the use of a polyesterase enzyme [the control].

REMARKS

I. The Rejections Under 35 U.S.C. 112, 2d Paragraph

Claims 5-7 are rejected because the claim does not identify what is meant as the control. Applicants have amended this claim to clarify that the control is simply an identical reaction performed without the polyesterase enzyme.

Claim 1 has been amended to incorporate additional limitations related to the nature of the polyester article to be treated and the results thereof.

Support for these amendments are found in the application as a whole.

II. The Rejections Under 35 U.S.C. Secs. 102 and 103

Claims 1, 2, 4-13 and 17 are rejected under 35 U.S.C. sec. 102(b) as being anticipated by Lund, JP 05344897, Enomoto, Peterson, EP 214,761, EP 476915 or Stewart. According to the Examiner, each of the references teaches modifications of a polyester with a polyesterase enzyme. Applicants traverse the rejection as none of the references disclose each and element of the claimed invention, as required for a proper rejection for anticipation.

For the purpose of placing the present invention in the proper context, Applicants offer the following brief synopsis of the invention and the problems solved. The use of polyester has become very popular due to its range of properties and flexibility of use in markets such as apparel, home furnishing, upholstery, film, rigid and flexible containers, non-woven fabrics, tire and carpet industries and has become the predominant reinforcement fiber in the United States. However, certain applications of polyester have been noticeably unsuccessful due in large part to surface properties that produce problems with respect to staining, water absorbance and retention, luster, comfort in textiles and appearance.

Current methods for modifying and improving the surface of polyester have included nucleophilic substitution, surface polymerization by cross-linking, chemical penetration of the fiber and topical application of a surface coating with affinity for polyester. However, these processes have significant drawbacks in chemical cost, energy and capital equipment, use of unsafe or undesirable solvents, limited flexibility and negative effects on strength. As a result, the industry is actively seeking new methods of producing novel polyester materials that do not possess these drawbacks.

In response to this need, Applicants have discovered that the use of a certain subclass of enzymes, i.e., polyesterase enzymes (enzymes having activity on polyester in the UV Assay or the MB Assay), can have a significant effect in improving the surface properties of polyester. Applicants clearly show in Example 1 that prior methods of determining enzymes for use with polyester were deficient in that they failed to provide meaningful guidelines regarding which enzymes will be effective. Moreover, as shown in Example 2, difficult to adhere chemicals (in this instance dyes) are better adhered after treatment of the polyester substrate with a polyesterase enzyme of the invention. Given that the prior art provides no disclosure or suggestion that enzymatic treatment of polyester would have such a result and further provides no disclosure that an enzyme as defined herein would be effective in modifying the surface properties of a polyester, Applicants submit that the present invention is both novel and unobvious. In response to the rejections under Sections 102 and 103 in the Office Action, Applicants provide the following detailed comments regarding the deficiencies of those rejections.

Lund discloses the chemical finishing of insoluble (primarily cellulosic) fibers which have appropriate exposed OH groups by reacting with carboxylic acids or carboxylic acid esters in the presence of a lipase. Lund discloses nothing about modifying the surface of a polyester enzymatically and discloses nothing which relates to the "polyesterase" enzyme as claimed herein.

JP 05344897 (abstract) discloses that aliphatic polyesters are decomposed with a lipase. The abstract mentions nothing about aromatic polyesters and further provides no information regarding the "polyesterase" enzyme as claimed herein.

Enomoto (U.S. Patent No. 4,876,024 and EP 214761) disclose the use of a detergent additive lipase for the purpose of cleaning soiled clothing. This process is intended for soiled,

finished articles and does not reflect on the use of the presently claimed invention which relates to polyesters prior to the application of a finish.

Peterson discloses the removal of hydrophobic esters such as oils, fats and waxes which build up on fabrics during processing. The fabrics to be treated are described in col. 1, line 60 et seq as "natural fibers with a residual content of naturally occurring triglycerides, e.g., native cotton . . flax . . . and wool". Peterson does not relate to the treatment of polyester with a polyesterase as claimed.

EP 476 915 discloses a method of preparing a stain resistant textile by impregnating and adsorbing to the textile a lipase enzyme. This disclosure bears no relation to the treatment of the surface of a polyester with a polyesterase enzyme as claimed.

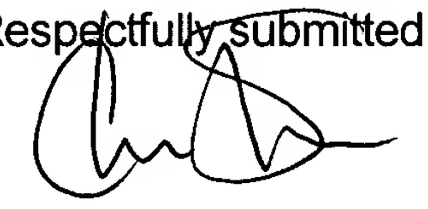
Stewart discloses compositions for removing oily triglyceride based stains from fabrics using lipase. This process is intended for soiled, finished articles and does not reflect on the use of the presently claimed invention which relates to polyesters prior to the application of a finish.

Claims 1-13 and 17 are further rejected under 35 U.S.C. sec 103 as being unpatentable over Lund, JP 05344897, Enomoto, Peterson, EP 214761 or EP 476915 taken with JP 52082774 (abstract). Applicants traverse the rejection.

Lund, JP 05344897, Enomoto, Peterson, EP 214761 and EP 476915 are discussed above. As indicated therein, none of these references disclose anything related to the treatment of a polyester as claimed. Moreover, none of these references would have suggested that a polyesterase enzyme, as claimed, would have had a reasonable expectation of success in producing a modified surface having the properties of the presently claimed invention. The JP 52082774 (abstract) fails to fill the critical gap in the disclosures despite its reference to aromatic polyesters. In fact, this abstract requires that the polyester be ground into a fine fiber or powder to increase the surface area. This step is antithetical to the claimed invention which is modifying the surface of a fiber, yarn or fabric and not decomposing that fiber, yarn or fabric.

For these reasons, as outlined above, Applicants respectfully request that the present rejections be withdrawn and that the claims be permitted to proceed to allowance.

Respectfully submitted,



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